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09/584,796	06/01/2000	Fredrik Lindqvist	1410-679	4990

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EXAMINER

JAMAL, ALEXANDER

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SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/584,796
Filing Date: June 01, 2000
Appellant(s): LINDQVIST ET AL.

John Lastova
For Appellant

SUPPLEMENTAL EXAMINER'S ANSWER

This is in response to the reply brief filed 2-15-2007 appealing from the Office action mailed 8-9-2005.

Responsive to the reply brief filed on 2-15-2007, a supplemental Examiner's Answer is set forth below:

In response to the argument (reply brief page 1) that the Ho reference cannot remove echo due to a previous signal in the frequency domain, examiner notes that all 'current' echoes are caused by 'previously transmitted' signals. In bidirectional communication links, an echo is formed when a portion of a previously transmitted signal is reflected back to the transmitting/receiving device and is combined with the received signal. Examiner again notes Ho Fig. 3 where echo estimate $E(f)$ is subtracted from the received signal via subtractor 58 in the frequency domain.

In response to appellant's statement that the examiner has elected not to address the specific problems of combining Ho, Chaffee, and Dowling (reply brief pages 1 and 2), examiner contends that the appellant is distorting the facts of this case. The appellant originally argued that the Ho, Chaffee and Dowling references could not be combined in the arguments filed 6-15-2005. In the subsequent final rejection filed 8-9-2005, the examiner explained in detail how the references could be combined (this portion is again cited in the Examiner's Answer under the **Responses to Appellant's Argument B**). The examiner described how the combination would function, and further noted that Dowling (who discloses the precoder) specifically states that the precoding function can be 'merged' with an echo canceller (Dowling Col 22 lines 1-17). The examiner offered an explanation in the 8-9-2005 final office action as to how the precoder would be 'merged' with an echo canceller. The examiner then requested appellant to offer any other alternate explanation as to how the precoder would be 'merged' with an echo canceller as per

Dowling and **not** read on appellant's claims. Examiner contends that the precoder would be implemented in the same manner as the 'encoder 12' disclosed in Ho Fig. 3. Appellant has offered no alternate explanations in response to examiner's request. Examiner contends that the appellant's problems with combining the Ho, Chaffee and Dowling references have been addressed.

In response to appellant's arguments that the examiner is making the assumption that the transmission channel is the same as the echo channel, the examiner strongly disagrees. The function taught by Dowling is a specific form of encoding a signal before it is transmitted (precoding). The encoding takes into account the ISI and ICI of the channel. When the Dowling encoder is implemented in the Ho system, it must be implemented at the 'encoder 12' block (Ho Fig. 3) in order for the echo canceller disclosed by Ho to function correctly. Note that the **encoded** signal is sent to the echo estimation stage 100 of Ho (Fig. 3). This is because an echo canceller must know what the outgoing signal is in order to be able to estimate the echo. The function of the echo estimation stage 100 is to estimate the 'echo channel'. When Dowling's precoder is implemented in the encoder stage of Ho, then the outgoing signal will take into account the ICI and ISI of the transmission channel. When the encoded signal is sent to echo estimator 100, estimator 100 will estimate the echo channel and use the encoded signal and echo channel estimate to produce an echo estimate (see Ho Col 1 lines 15-45). The echo estimate will be based off signals that take into account the transmission channel. If the signals transmitted (and also fed into the echo path estimator 100 of Ho) take into account the transmission channel ICI and ISI, then the echo estimate will also take into account the effects of the transmission channel that cause ISI and ICI in the echo channel. The echo channel is derived, in part, from

the transmission channel. The whole purpose of the echo canceller stage 100 in Ho Fig. 3 is to estimate what happens to the outgoing signals when they are sent on the transmission channel, that estimate is an estimate of the echo channel. The echo channel is based on both the outgoing signal properties and the transmission channel properties. If the outgoing signals are resistant to transmission channel ISI and ICI, then the echo estimate is resistant to the echo channel ICI and ISI in order for the canceller to function correctly. Dowling already contemplates this when he states that the precoder may be merged with an echo canceller. Furthermore, examiner notes that none of appellant's claims refer to ISI or ICI caused specifically by the echo channel, only that the echo channel estimate takes into account the effects of ICI or ISI (appellant's claims 20-21). The echo estimator 100 of Ho Fig. 3 will take into account the effects of ISI or ICI because it relies on precoded signals (which take into account ISI or ICI) from the Dowling precoder implemented in the encoder stage 12 of Ho.

Furthermore, examiner notes an additional viewpoint for consideration by the board concerning appellant's above argument. It being that the echo canceller of Ho would function to remove all forms of echo. When the echo canceller has 'converged' (Ho Col 6 line 34-49), then the echo canceller will produce the exact echo estimate which is based off the transmitted signals and the echo path. The echo estimate will completely cancel the echo from the received signal. This echo would include echo caused by ISI, ICI or any other echo channel properties (such as an impedance mismatch in the transmission channel). As an example, if carrier A produces 'echo ICI' in carrier B (the 'effects of ICI' of appellant's claim 20), then a converged echo canceller would still see the 'echo ICI' in carrier B as echo, and adaptively estimate and cancel

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that echo because the echo canceller is using the originally transmitted carrier B as a reference (before it is corrupted by echo from any sources).

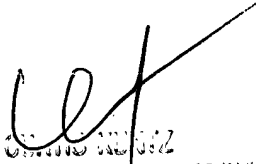
Appellant may file another reply brief in compliance with 37 CFR 41.41 within two months of the date of mailing of this supplemental examiner's answer. Extensions of time under 37 CFR 1.136(a) are not applicable to this two month time period. See 37 CFR 41.43(b)-(c).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 571-272-7498. The examiner can normally be reached on M-F 9AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 571-272-7499. The fax phone numbers for the organization where this application or proceeding is assigned are **571-273-8300** for regular communications and **571-273-8300** for After Final communications.

AJ
March 11, 2007


SINH TRAN
SUPERVISORY PATENT EXAMINER


09/584,796
EXAMINER'S ANSWER
MARCH 11, 2007